

2025-01-27

- Sub D5

Sub D4

Sub D5

~~9. The apparatus for enhanced detection of a biological reaction of Claim 3 wherein the flow cell further includes an inlet port and an outlet port.~~

~~10. The apparatus for enhanced detection of a biological reaction of Claim 9 further including a reservoir attached to the outlet port.~~

~~11. The apparatus for enhanced detection of a biological reaction of Claim 10 wherein the reservoir comprises a waste tube.~~

10 ~~12. The apparatus for enhanced detection of a biological reaction of Claim 10 wherein the reservoir comprises an expandable structure.~~

~~13. The apparatus for enhanced detection of a biological reaction of Claim 1 wherein the biochip is~~
15 ~~disposed on a circuit board.~~

~~14. The apparatus for enhanced detection of a biological reaction of Claim 13 wherein the circuit board is a PCMCIA board.~~

~~15. The apparatus for enhanced detection of a biological reaction of Claim 13 further including wires connecting the biochip to the circuit board.~~

~~16. The apparatus for the enhanced detection of a biological reaction of Claim 15 wherein the circuit board is a printed circuit board.~~

25 ~~17. The apparatus for the enhanced detection of a biological reaction of Claim 15 wherein the wires are embedded in a protective material.~~

~~18. The apparatus for enhanced detection of a~~

000000-000000

19. A method for the enhanced detection of a bio-
5 logical reaction between a sample containing material to
be detected and a biochip, the biochip having an active
area, comprising the steps of:

10 activating the biochip for the detection of the
material within the sample, and
 flowing the material to a reservoir.

20. The method for enhanced detection of a biological reaction of Claim 19 further including the step of
15 detecting the presence of the sample material at the biochip.

21. The method for enhanced detection of a biological reaction of Claim 20 wherein the detection step comprises optical detection.

20 22. The method for enhanced detection of a biological reaction of Claim 21 wherein the optical detection includes fluorescence detection.

23. An optical detection system for providing radiation to a region of interest of a sample and for providing radiation from the region of interest to a detector, comprising

an excitation fiber having an input end and an output end,

a light guide adapted for disposition between the region of interest of the sample and the detector, and

the excitation fiber including an axially region, the axially region including the output end of the exci-

excitation fiber, wherein the excitation fiber in the a
ly region is substantially parallel to the axis of
light guide.

24. The optical detection system of Claim 23
5 wherein the excitation fiber is a fiber optic.

25. The optical detection system of Claim 23 wherein the light guide comprises a liquid light guide.

26. The optical detection system of Claim 23 further including an excitation source adapted to provide
10 radiation to the excitation fiber at its input end.

27. The optical detection system of Claim 26 wherein the excitation source is a laser.

28. The optical detection system of Claim 23 further including a fiber launch system optics adapted to receive radiation from an excitation source and to provide it to the input end of the excitation fiber.

29. The optical detection system of Claim 23 wherein the axial region of the excitation fiber is coaxial with the light guide.

20 30. The optical detection system of Claim 23
wherein the light guide further includes optical ele-
ments.

31. The optical detection system of Claim 30 wherein the optical elements include at least one lens.

25 32. The optical detection system of Claim 31
wherein the optical elements include a proximal lens
adapted to receive the radiation from the region of
interest.

33. The optical detection system of Claim 32 wherein the proximal lens includes an aperture through which the output end of the excitation fiber is disposed.

5 34. A method for hybridization analysis between a sample and a probe, the analysis utilizing an electronic stringency control device, comprising the steps of:

providing the sample and probe with a fluorescent label under hybridization conditions on the electronic
10 stringency control device, forming a fluorescently labelled hybridization product,

monitoring the fluorescence from the hybridization product,

15 subjecting the hybridization product to varying electrophoretic force, and
analyzing the fluorescent signal.

35. The method for hybridization analysis of Claim 34 wherein the fluorescence is analyzed for the fluorescent perturbation value.

20 36. The method for hybridization analysis of Claim 35 wherein the fluorescence perturbation value is measured for the onset value.

37. The method for hybridization analysis of Claim 35 wherein the fluorescence perturbation value is measured
25 for its height.

38. The method for hybridization analysis of Claim 35 wherein the fluorescence perturbation value is measured for the slope.

39. The method for hybridization analysis of Claim
30 34 wherein the fluorescence is analyzed for the power level of the perturbation.

000000-9926560

40. The method for hybridization analysis of Claim 34 further including the steps of:

determining a second measure of hybridization between the sample and the probe, and

5 combining the information obtained by the first analysis including the step of subjecting the hybridization product to the varying electrophoretic force in the second measure to provide a indication of hybridization.

41. The method for hybridization analysis of Claim 10 40 wherein the second measure of hybridization includes determination of the electronic melting point.

42. The method for hybridization analysis of Claim 34 wherein the fluorescent label is placed in proximity to the initial denaturation site.

15 43. The method for hybridization analysis of Claim 42 wherein the fluorescent label is intercalated adjacent a single based mismatch site.

44. The method for hybridization analysis of Claim 43 wherein the fluorescent label is ethidium bromide.

20 45. The method for hybridization analysis of Claim 43 wherein the fluorescent label is acridine.

46. The method for hybridization analysis of Claim 34 wherein the electrophoretic force is in an amount less than is necessary to effect dehybridization of the 25 sample and the probe.

47. The method for hybridization analysis of Claim 34 wherein the hybridization product is subject to an oscillating electrophoretic force.

000000-999999

48. A method for DNA fingerprinting on an electronically addressable array, the array having capture probes at individual test sites and fluorescent markers associated with the hybridized materials at the sites,
- 5 comprising the steps of:
- hybridizing DNA fragments of a first length to the capture probes at a first test site,
 - hybridizing DNA fragments of a second length to the capture probes at a second test site,
 - 10 observing the fluorescent signal from one or more test sites as the potential at the electronically addressable array site is reversed, and
 - detecting those sites which achieve dehybridization at a potential.

000250-9926560